

Remarks

Preliminary Matters

Claims 2, 3, and 13 have been cancelled. No Claims have been added, but Claim 20 has become independent. Nonetheless, there are no more than three independent claims pending. Therefore, no additional fees are required. If determined otherwise, the Office is authorized to charge Deposit Account No. 07-1077 for the amount.

Information Disclosure Statement

After the mailing of the Office Action in May, Applicants submitted a Supplemental Information Disclosure Statement in June and would appreciate the establishment in the record that the Examiner has considered that Supplemental Information Disclosure Statement.

Specification Amendment In Response to Specification Objection

The paragraph on page 6, lines 7-11 has been amended to clarify what is meant by "strictly". Support for the additional language is found in the immediately preceding paragraphs, particularly at page 5, line 8 and line 29 and at page 6, line 4. No new matter has been added.

Claim Objections

Applicants have cancelled Claims 2 and 3 in favor of amendment to Claim 17. Applicants have cancelled Claim 13.

Claim Rejections for § 112

Applicants have amended Claim 1 (and the other two independent claims 11 and 20) to emphasize and clarify what two types of polyolefin comprise the claimed polyolefin alloy. Applicants have retreated from preliminary amendments made during the International Stage of this application which caused the Office's concern

about terminology in this National Stage examination. Applicants have drawn from page 4, lines 30-31; page 5, lines 1-5; page 5, line 8 and lines 16-17; and page 6, lines 7-11 (as amended in this response) to explain that there are two different types of polyolefins in the alloy.

The first type of polyolefin, the so-called "strictly thermoplastic" are in need of modulus modification. The second type of polyolefin, the polyolefin elastomer provides that modulus modification. The reason for the presence of both types is explained at the paragraph beginning at page 5, line 26.

Applicants have amended Claim 1 and Claim 15 to delete "about".

Finally, Applicants have amended Claims 1 and 15 to recite "parts by weight". Applicants have used that phrase in related amendments to Claim 20. Support for this set of amendments is found in Table 2 on pages 16 and 17 wherein the division of hydroxide flame retardant (29.04 weight percent) into the polyolefin alloy (EVA + LLDPE + LDPE + Ethylene-Octene Copolymer (43.84 weight percent)) yields 66 parts by weight of hydroxide flame retardant per 100 parts by weight of polyolefin alloy.

§ 103 Rejections

The Office has rejected all pending claims applying any of 15 different primary references, in view of U.S. Pat. No. 6,232,377 (Hayashi et al.) Applicants appreciate the effort by the Office to identify the location of relevant information in the primary references and in Hayashi et al. ('377). The undersigned has used that useful information to categorize the 15 different primary references, in order to establish remarks for patentability of all pending claims, as amended.

There are three categories of primary references, to be addressed separately.

1. The first category of references are those references that do not disclose or suggest the use of an *intercalated nanoclay* as an ingredient in the compositions disclosed, for any purposes. Those references are:

U.S. Pat. Nos.

5,462,987 (Shinonaga et al.);
5,889,087 (Hayashi et al.);
5,889,100 (Asai et al.);
6,072,005 (Kobylivker et al.);
6,846,872 (Nishihara); and
6,869,993 (Watanabe et al.)

U.S. Patent Application Publication

US 2002/0006998 (Furukawa et al).

Because the Office states the secondary reference, U.S. Pat. No. 6,232,377 (Hayashi et al.) does not disclose nanoclay, with which Applicants agree, all pending claims which require *intercalated nanoclay* are patentable over these 6 different primary reference/secondary reference rejections under §103.

Applicants have amended all pending claims to make it abundantly clear that *intercalated nanoclay* is not the same as clay, disclosed in the primary references as inorganic filler. Support for the amendment to the claims to add *intercalated* is found at page 1, line 22 and at page 8, lines 5-17. Applicants are claiming as one of their flame retardants *intercalated nanoclay* because of their surface-treated platelet morphology. Please see also page 9, lines 5-8.

2. The second category of references are those references that do not disclose nanoclay *and also* do not disclose or suggest a second type of polyolefin that is elastomeric and serves to modify the modulus of the first type of polyolefin. Those references are:

U.S. Patent Application Publications

US 2004/0002569 (Kitano et al.); and
US 2005/0032959 (Cheung et al.)

For the same reason as the first category, the combination of either patent application publication with U.S. Pat. No. 6,232,377 (Hayashi et al.) fails render Applicants' pending claims obvious because neither side of the combination discloses

or suggests *intercalated nanoclay*. Moreover, the primary references lack a teaching of a modulus-modifying polyolefin.

3. The third category of references are those which do disclose intercalated nanoclay but fail to disclose or suggest the claimed combination of ingredients found by Applicants to be so useful. The secondary reference, U.S. Pat. No. 6,232,377 (Hayashi et al.) does not complete a combination of prior art that renders the pending claims obvious for reasons addressed below. Those references are:

U.S. Pat Nos.

5,091,462 (Fukui et al.);
6,414,070 (Kausch et al.);
6,492, 453 (Ebrahimian et al.);
6,750,282 (Schall et al.)¹; and
6,924,334 (Fukatani et al.)

PCT Patent Publication No.

WO 03/082966 (Compco)

5,091,462 (Fukui et al.) + U.S. Pat. No. 6,232,377 (Hayashi et al.)

To the extent that Fukui et al. are concerned with intercalated nanoclay, it is limited to one embodiment for a modified polypropylene and a polyamide modified with the clay mineral. Applicants' pending claims are to a polyolefin alloy, not a polyamide-containing thermoplastic resin composition as disclosed by Fukui et al. Hayashi et al. ('377) does not fill any gaps in the disclosure of Fukui et al. because Hayashi et al. ('377) does not disclose or suggest any intercalated nanoclay, for any purpose. Indeed, Hayashi et al. ('377) teach toward a "Flame Retardant Composition" that does not recognize the value of *intercalated nanoclay* as a flame retardant ingredient.

¹ It is arguable that Applicants' priority application filing date precedes the §371 filing date of this patent, but the PCT publication of this patent was published, in German, more than one year before the filing of Applicants' priority provisional patent application. Therefore, the undersigned will use the English text of the reference, the National Stage entry of the PCT Publication, in this response.

6,414,070 (Kausch et al.) + U.S. Pat. No. 6,232,377 (Hayashi et al.)

The disclosure of Kausch et al. has been discussed in the Applicants' specification, because Kausch et al. are also striving for flame retardant sheets and laminates. Please see page 2, lines 7-10. The optional inorganic flame retardant in Kausch et al. is limited to an amount of a maximum of 50 parts by weight per 100 parts by weight of polyolefin polymer or copolymer. Please see Col. 5, lines 57-62. Applicants specifically claim 65 parts by weight of their hydroxide inorganic flame retardant per 100 parts of polyolefin alloy for a significant reason: the composition of Table 2 (66 parts by weight of hydroxide flame retardant per 100 parts of polyolefin alloy), when laminated to adhesive passed the stringent ASTM E84-01 flame test, making the compound of the present invention valuable as a surface covering as defined in the specification at page 4, lines 4-10. As such, compounds of the present invention, when formed into surface coverings *are both made of polyolefin having a good 'hand' and pass certain industry standard tests for wall and other surface coverings.*

Hayashi et al. ('377) can not be stated to fill in the gaps found in Kausch et al. for several reasons. First, no one of ordinary skill in the art would be motivated to look from Kausch et al. to Hayashi et al., because Kausch et al. already have both intercalated nanoclay and optional inorganic flame retardant up to 50 parts per 100 parts of polymer or copolymer. Second, even if one looked from Kausch et al. to Hayashi et al. ('377), there would be no motivation to take from Hayashi et al. ('377) because there is no teaching or suggestion of a use of intercalated nanoclay along with other flame retardants. Third, Hayashi et al. criticize the use of metal hydroxides for polyolefin resins. Please see Col. 1, lines 21-26. To solve the criticism, Hayashi et al. ('377) went entirely in a *different direction* with a flame retardant package that included a triazine ring containing compound and a Markush group of other flame retardant compounds. The key point of the deficiency of Hayashi et al. is found at Col. 6, lines 11-13: "It should be noted that the flame retardant portion of this

composition of this invention is made up of components (D), (E), and (F)." None of those includes *intercalated nanoclay*. Anyone skilled in the art would not seek to combine the teachings of Kausch et al. and Hayashi et al. ('377) *because they teach in totally different directions with respect flame retardant additives*.

6,492,453 (Ebrahimian et al.) + U.S. Pat. No. 6,232,377 (Hayashi et al.)

Ebrahimian et al. lack a very key feature found in Applicants' invention as claimed: the other type of polyolefin to modify the modulus of the first type of polyolefin, in order to provide the "hand" that is significant for use of Applicants' compounds as a film for surface coverings. Please see page 5, beginning at line 26. This patent discloses formulations for telecommunication cables, not surface coverings.

Hayashi et al. ('377) is a disclosure *also* for communications cable. Please see Col. 8, lines 57-65. No one of ordinary skill in the art would think to combine Ebrahimian et al. with Hayashi et al. ('377) because the two references, both for communications cables, teach different flame retardant additive packages. Again, the problem Hayashi et al. solved was using a combination of flame retardants with metal hydroxide flame retardant, none of the additional flame retardants being intercalated nanoclay. Ebrahimian et al. and Hayashi et al. ('377) teach in different directions with respect to flame retardants to be employed.

Moreover, one skilled in the art would not look to Hayashi et al ('377) to alter Ebrahimian et al.'s polyolefin blend because neither of them recognize or suggest the value of providing a modulus-modifying polyolefin to make a polyolefin in the form of an expansive film suitably pliant for use. This is especially true for Claims 18-20.

6,750,282 (Schall et al.) + U.S. Pat. No. 6,232,377 (Hayashi et al.)

Schall et al. lacks the same key feature found in Applicants' invention as claimed: the other type of polyolefin to modify the modulus of the first type of polyolefin, in order to provide the "hand" that is significant for use of Applicants' compounds as a film for surface coverings. Please see Col. 3, lines 48-63, where

Schall et al. teach a very broad selection of polymers, but none of them as a second polyolefin for the purpose of modifying the modulus of a first polyolefin to impart pliability and responsiveness in feel during manufacturing and application in the form of a surface covering.

The same reasons that Hayashi et al. ('377) is deficient as a secondary reference for Ebrahimian et al. are also applicable here. While the uses contemplated by Schall et al. are less explicit, as compared with Ebrahimian et al., it remains certain that no one of ordinary skill in the art of making surface coverings would be motivated to use a teaching with respect to flame retardant composition for a communications cable to make a flame-retardant polyolefin alloy for surface coverings such as walls, floors and ceilings. This is especially true for Claims 18-20.

6,924,334 (Fukatani et al.) + U.S. Pat. No. 6,232,377 (Hayashi et al.)

Fukatani et al. are also interested in cable jacketing and sheathing. Please see Col. 2, lines 42-45 and Claims 17-18. Like Ebrahimian et al. above, Fukatani et al. lack a teaching of the use of a second polyolefin to modify the modulus of a first polyolefin, especially for laminates for walls, floors and ceilings. The Office referred to Claim 15, but that AB type block copolymer bears no relation to the "other type of polyolefin" as Applicants have now claimed.

The same reasons that Hayashi et al. ('377) is deficient as a secondary reference for Ebrahimian et al. are also applicable here. The uses contemplated by Fukatani et al. are the same as Ebrahimian et al., making it quite certain that no one of ordinary skill in the art of making surface coverings would be motivated to use a teaching with respect to flame retardant compositions for cable to make a flame-retardant polyolefin alloy for surface coverings such as walls, floors and ceilings. This is especially true for Claims 18-20.

WO 03/082966 (Compeco) + U.S. Pat. No. 6,232,377 (Hayashi et al.)

Applicants' patent application claims priority from Provisional Patent Application 60/479,009 filed on June 17, 2003. Please see Page 1, lines 5-8.

The Compco application, filed internationally on March 28, 2003, was published in English on October 9, 2003, designating the USA, based on a priority application filed in Australia on March 28, 2002. Therefore, it appears that Publication WO 03/082966 has a §102(e) prior art effect as of March 28, 2003 according to MPEP §1857.01.

But as indicated in Applicants' Supplemental Information Disclosure Statement, Applicants had a compound, as claimed, which passed the ASTM E84 test in September 2002, which is initial evidence of an actual reduction to practice of the claimed invention prior to the §102(e) date of the Compco application, March 28, 2003.

Therefore, Applicants reserve the right to file a §131 Affidavit antedating this Compco publication in the event that the following remarks are not persuasive.

Compco teaches a flame retardant package of borates and metaborates, not metal hydroxides. Please see Page 14, lines 12-14. Compco does disclose metal hydroxides as optional or additional fillers. Please see Page 9, lines 18-31. But there is no apparent teaching or suggestion of how much optional or additional filler is suitable.

By direct comparison, Applicants claim at least 65 parts by weight of hydroxide flame retardant per 100 parts by weight of polyolefin alloy, precisely because it was found in the reduction to practice of the invention, as seen in Table 2, that a significant amount of hydroxide flame retardant is needed for the compound of the present invention.

There is no motivation to one of ordinary skill in the art from reading Compco to seize the need to include a significant amount of hydroxide flame retardant for a flame retardant compound intended for making into surface coverings.

Moreover, while the Compco publication discloses usages including films, sheet, etc., (Please see Page 16, line 13-19), it is critical to note that Compco requires the composition of its invention to be "cross-linkable" or "cross-linked". Please see also Page 7, lines 9-19.

Applicants do not want cross-linkable or cross-linked polymers. Applicants want a polyolefin alloy that has a modulus suitable for handling films during manufacture and application as surface coverings. Compco teaches toward silane grafting, crosslinking, or radiation crosslinking "at any stage of the process". Please see Page 9, lines 32-35.

Compco does not discriminate among the many uses shown on pages 16 and 17. In short, Compco as a disclosure lives up to its title: "Cross-linkable and/or Cross-Linked Nanofiller Compositions", not a flame retardant polyolefin alloy compound Applicants are claiming.

Hayashi et al. ('377) fails to fill the gaps in the Compco publication. Because Compco is not focused in the direction of a flame-retardant composition, Hayashi et al. ('377)'s attention to flame retardant packages that move away from, and never suggest, intercalated nanoclay shows how one skilled in the art would NOT be motivated to combine Compco with Hayashi et al. ('377). It is not obvious to one skilled in the art of making films and laminates for wall coverings, etc. to go to the art of compounds for communications cables for disclosure of either polymer systems or flame retardant packages. This is especially true for Claims 18-20.

Other Statements by the Office

The Office stated some general conclusions at the end of Paragraph 8 of the Office Action, to which Applicants reply.

The Office considers it "obvious ... to select applicant's ingredients from a list of equivalents." While this statement is not entirely clear as to which ingredients and which list of equivalents from the many references cited, Applicants have tried in these remarks to show exactly why the conclusion quoted is not true. One skilled in the art of polymer compounding must first have found a polyolefin, then a modulus-modifying second polyolefin, then a combination of flame retardants, one of which being an intercalated nanoclay and the other being at least a hydroxide, resulting in a combination that is shown, when laminated to an adhesive to pass an ASTM flame

test which is an industry standard. That achievement is definitely not obvious; it is patentable.

The various elements may have been present in different parts of the prior art, but even a new combination of old elements is patentable. It only seems obvious after it has been accomplished.

The Office stated "To add another flame-retardant to a flame-retardant composition is obvious." The statement appears to challenge the desire to use different types of flame retardants, just as Hayashi et al ('377) had done and were granted a patent. To be sure, there are primary references cited which disclose both a nanoclay based flame retardant and an inorganic flame retardant, but again, one must consider the new combination of ingredients that Applicants claim, which is not found in any single prior art reference. And because Hayashi et al. ('377) teaches in a totally different direction, *away from* a flame retardant package that included intercalated nanoclay, it seems inappropriate for the Office to make the conclusion quoted without some supporting evidence.

The Office stated "Whether barium metaborate is added as a biocide, a filler or a flame retardant is immaterial." According to Paragraph 8 of the Office Action, the disclosure of barium metaborate appears in Hayashi et al. ('087) and Nishihara et al., both of which, being of the first category of primary references, do not teach or suggest the use of intercalated nanoclay for any purpose. Therefore, because none of the third category of primary references discloses the presence of barium metaborate, for any purpose, Claims 11, 12, and 14-16 are especially patentable as presenting a new combination not found in any of the references cited.

The Office made a statement about metallocene catalyzed polymers being the same in composition as polymers yielded by the Ziegler-Natta process. Because none of the Claims retains the reference to metallocene-catalysis, this statement is moot for the pending claims.

Conclusion on §103 Rejections

Confronted with 15 different primary references and 1 secondary reference, the undersigned has undertaken a careful categorization and refutation of each of the 15 combination rejections.

The many amendments made to the Claims have addressed the §112 and §103 rejections. The new combination of elements constituting the claimed flame-retardant compound has resulted in patentable subject matter for all pending Claims, as emphasized by these extensive remarks.

In so doing, it is hoped that the Office will take into consideration the differentiation of claimed subject matter when reviewing the pending claims and these remarks.

For example, Claim 4 emphasizes the one type of polyolefin is actually two different polyethylene polyolefins and ethylene-vinyl acetate.

Claim 7, with support from Table 1 emphasizes the weight percent of the modulus-modifying polyolefin in the total compound.

Claim 11 retains the nature of the compound as biocidal, while adding the subject matter of the two different types of polyolefins and intercalated nanoclay, for clarification purposes. Claim 14 is analogous to Claim 4.

Claim 17 is a restatement of Claims 2 and 3 in proper claiming format, relying also on the patentable subject matter of Claim 1.

Claims 18-20 are especially patentable because the claimed article is a surface covering comprising a film of the compound of Claim 1, laminated to a water-based adhesive etc. Of the references cited, only the Compco article quite generally and Kausch et al. in any detail discuss laminates of any kind. Neither of them state anything whatsoever about the type of adhesive to be used in the laminate for a surface covering. And neither of them demonstrate or even suggest the ability of the laminate to pass the industry standard ASTM E840-01 flame test for interior walls. Support for the flame test clause comes from Page 2, lines 22-24 and Page 16, line 11 et seq.

Applicants have found, unexpectedly when compared with the 15 primary references combined alternatively with a single secondary reference, that a combination of polymers to make a polyolefin alloy and a combination of flame-retardant agents can be assembled into a compound that has sufficient polymeric integrity and feel and sufficient flame retardancy to pass a stringent building code test for flame retardant surface coverings for occupied buildings. Applicants and their Assignee request a Notice of Allowance for all pending Claims 1, 4-12, and 14-20.

If there are any matters that prevent a Notice of Allowance, the Examiner is invited to contact the undersigned by telephone.

August 11, 2006
Date

Respectfully submitted by:

John H. Hornickel
John/H. Hornickel
Registration No. 29,393

PolyOne Corporation
33587 Walker Road
Avon Lake, Ohio 44012
Telephone: 440-930-3317
Fax: 440-930-1179
John.Hornickel@PolyOne.com